DATA RELATING TO THE NATIONAL INSTITUTES OF HEALTH

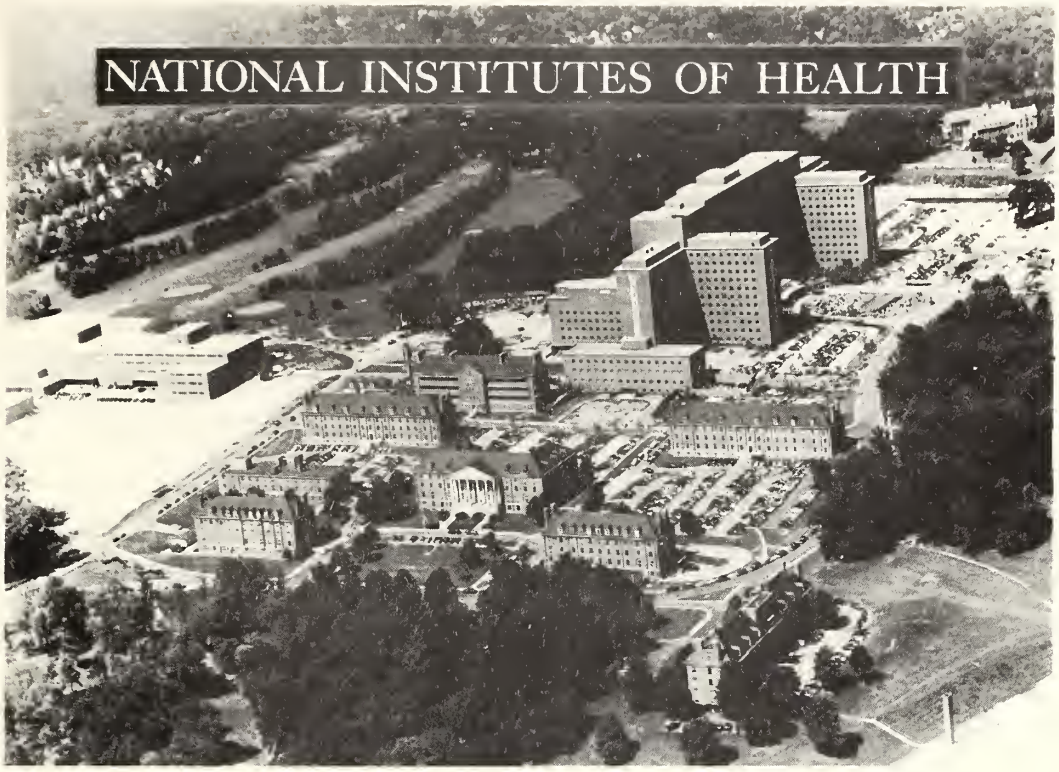
Its Organization, Activities and Budget

September 1958

NATIONAL INSTITUTES OF HEALTH
PUBLIC HEALTH SERVICE
U. S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE

CONTENTS

Office of Research Information
National Institutes of Health
Bethesda 14, Maryland



The National Institutes of Health, a bureau of the Public Health Service, is devoted to the conduct and support of medical research. Its laboratories, offices, and Clinical Center—a 516-bed research hospital—are located on a 305-acre tract at Bethesda, Md., a suburb of Washington, D.C.

NIH is concerned primarily with the major killing and crippling diseases. The scope of its work is indicated by the titles of the seven Institutes—Allergy and Infectious Diseases, Arthritis and Metabolic Diseases, Cancer, Dental Research, Heart, Mental Health, and Neurological Diseases and Blindness.

Serving NIH as a whole is the Clinical Center and three Divisions—Research Grants, Research Services, and Business Operations. Two other Divisions—Biologics Standards and General Medical Sciences—conduct independent programs, the one regulatory, the other investigative.

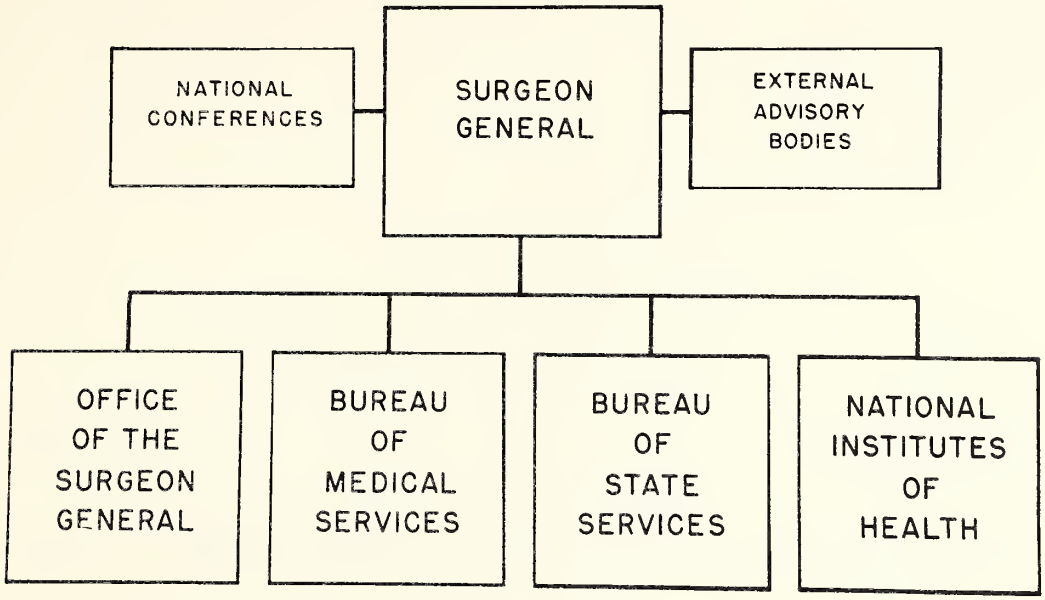
In the air-view above, the Administration Building can be identified by the colonnade. The Clinical Center is the largest building, and the others shown are laboratories.

The NIH staff in mid-1958 comprised about 7000 persons, including 1000 with doctoral degrees.

For fiscal year 1959, Congress appropriated $324.4 million to the various NIH programs. Of this, about 80 percent is for grants in support of research projects, training, and construction at non-Federal institutions. NIH conducts or supports nearly half of the medical research in the United States.

The following pages present data on the organization, functions, and budget of NIH, and attempt to show the place of its programs in the national medical-science structure.

DEPARTMENT OF HEALTH, EDUCATION, & WELFARE
PUBLIC HEALTH SERVICE



The Public Health Service is the principal agent of the Federal Government for protecting the Nation's health. As part of the U. S. Department of Health, Education, and Welfare, it is closely allied with related Federal programs.

The Surgeon General is assisted by highly qualified advisory groups that bring to the Service the diversity of judgment, outlook, and background essential to a balanced and effective program of medical research and public health.

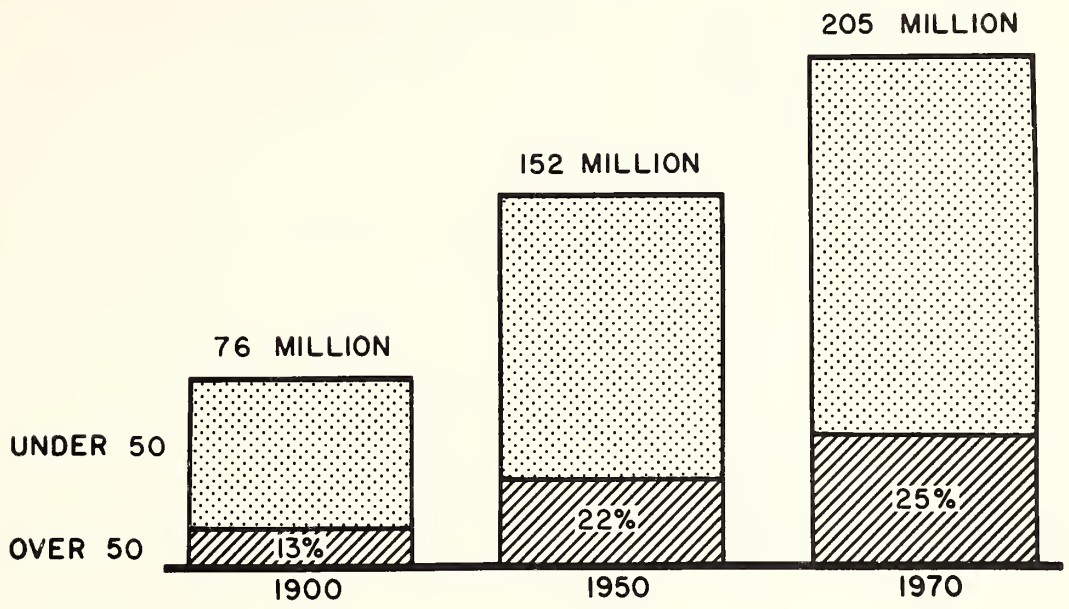
The Office of the Surgeon General, a bureau of the Public Health Service, develops policy, coordinates programs, and provides administrative staff services.

The Bureau of Medical Services extends a full range of hospital and medical services to designated classes of beneficiaries, aids in developing the Nation's hospital and related facilities, and enforces national quarantine laws.

The Bureau of State Services assists the States in developing community health services and in applying new knowledge to control disease. Important techniques are field investigations and demonstrations, and general and special health grants.

The National Institutes of Health is the center of medical research activities in the Public Health Service. Its origin was a laboratory of bacteriology established on Staten Island, N. Y., in 1887. The Hygienic Laboratory moved later to Washington, D.C., became the National Institute of Health in 1930, and moved to Bethesda in 1938. Ten years later NIH acquired the plural title—Institutes. The seven Institutes were formed between 1937 and 1950, growing out of older laboratories. The Clinical Center was opened in 1953.

GROWING & AGING POPULATION



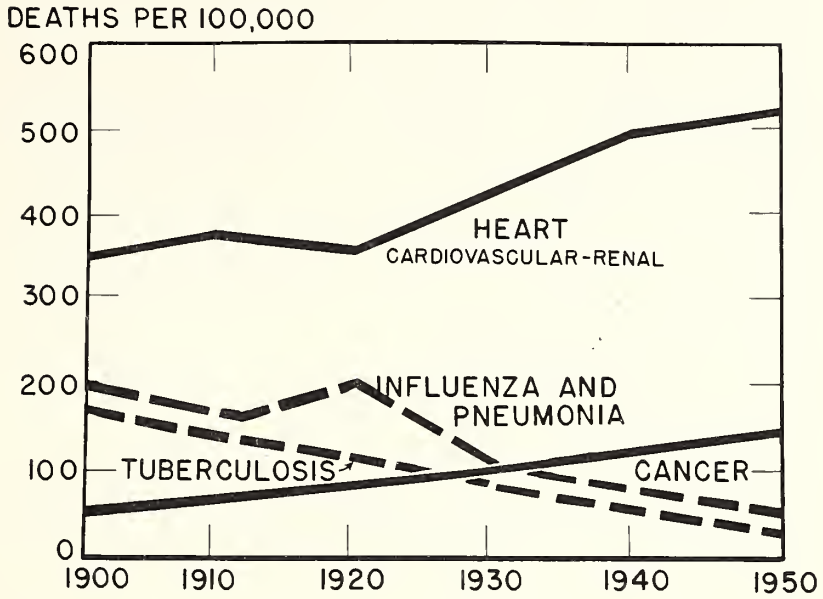
One of the most significant facts underlying the mission of NIH is the increasing proportion of the Nation's population over fifty years of age.

This trend means that in years to come, the attention of medical science will be increasingly focused on the diseases and disabilities which affect people in their middle age and later years.

The shift to an older population has been gradual. By 1970, nearly 25 percent of the American people will be over fifty. Ten percent will be over 65.

Subsequent charts show that the shift to emphasize research on diseases affecting older people is already well advanced.

CHRONIC DISEASES RISE
INFECTIOUS DISEASES DECLINE



A substantial part of the increase in our total population and in the proportion of older people results from the remarkable decline in death rates from infectious diseases.

This decline is attributable to medical advances (vaccination, antibiotics, etc.), to better sanitation and other public health measures, and to a general rise in the standard of living. To some extent, then, the decline is the payoff from medical research to date.

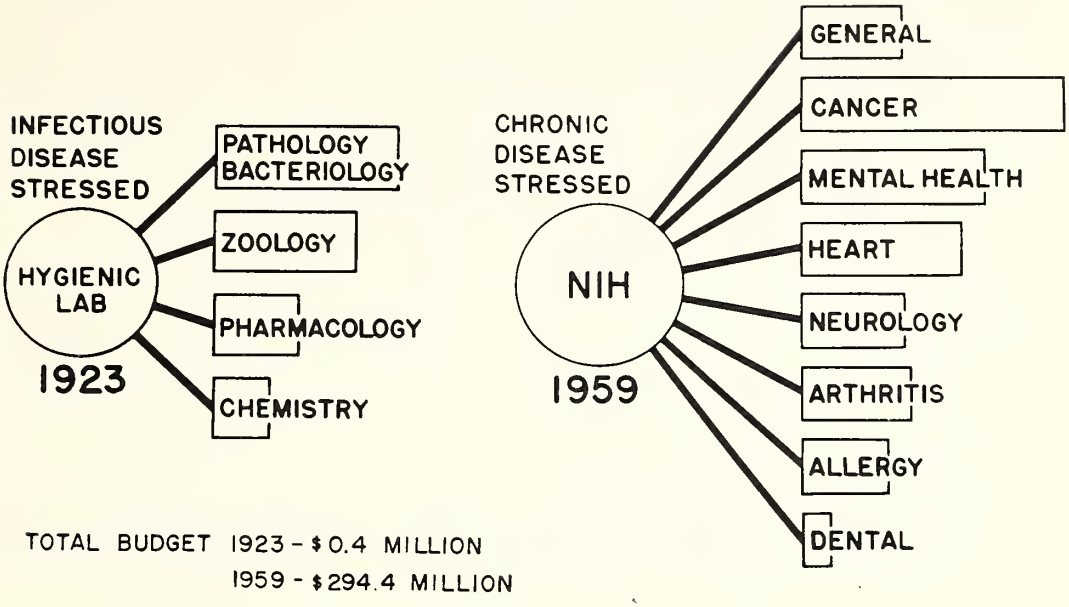
Meanwhile the chronic diseases have been increasing in importance. "Chronic disease" is a shorthand term for diseases that are generally noninfectious and typically slow in developing, such as cancer, heart disease, and neurological disorders.

Of major significance are the heart diseases, since they now claim more than 500 lives a year among every 100,000 persons. (Diseases of the circulatory system and the kidneys are combined because most fatal kidney disease is arterial.)

Note how the influenza epidemic of 1918 pushed up the death rate from this disease and thus halted temporarily the rise in heart deaths. If an influenza virus of extreme virulence appeared again, present knowledge could not necessarily prevent a duplication of the 1918 calamity. This is mentioned to emphasize that research in the infectious diseases must remain strong.

Largely because of progress against infant mortality, life expectancy from birth has risen from 47 years in 1900 to 70 years today—an increase of nearly 50 percent. By contrast, the average person aged 50 in 1900 could expect to live 21 years, as compared with only 25 years today—an increase of less than 20 percent. This again demonstrates the need for a concentration of research on the health problems associated with age.

NIH-CHANGE IN EMPHASIS



TOTAL BUDGET 1923 - $0.4 MILLION
1959 - $294.4 MILLION

The medical research effort of this country has shifted in response to the mounting importance of chronic disease, and because broad scientific advances have made areas of study fruitful that were previously barren.

This trend has been reflected in the research patterns at NIH. In 1923 the Public Health Service conducted little research on such problems as cancer, heart disease, or arthritis. Instead, the NIH of that time (known as the Hygienic Laboratory, when PHS was part of the Treasury Department) was staffed largely with microbiologists. There were few scientific leads that made research in chronic diseases attractive, and the relative importance of those diseases was not yet clear.

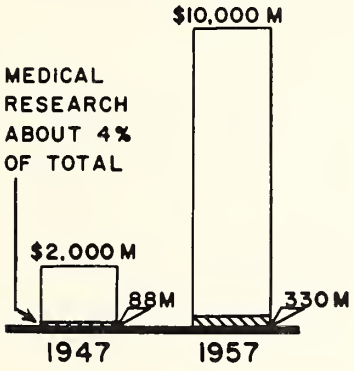
By contrast, the Institutes in 1959 show an emphasis on the chronic diseases, which are the major health problems today in terms of mortality, disability, and economic burden.

Among the programs grouped as "general" are studies on aging itself supported by the Center for Aging Research, a branch of the Division of General Medical Sciences.

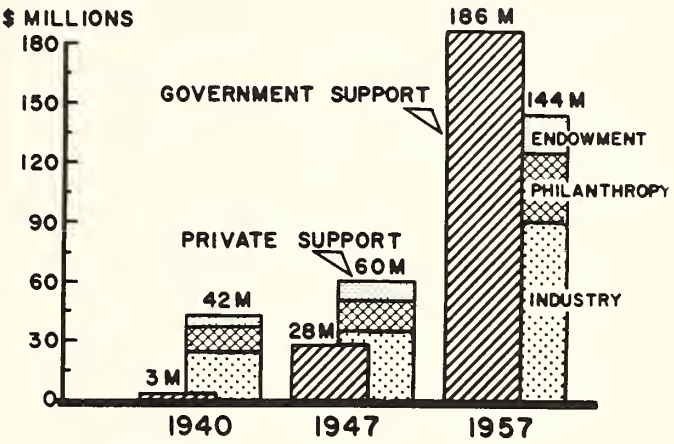
A major trend in NIH programs has been the relative expansion of grants and training awards to help increase knowledge and manpower in chronic disease areas.

RESEARCH FUNDS
BEFORE AND AFTER WORLD WAR II

ALL RESEARCH & DEVELOPMENT



MEDICAL & BIOLOGICAL RESEARCH



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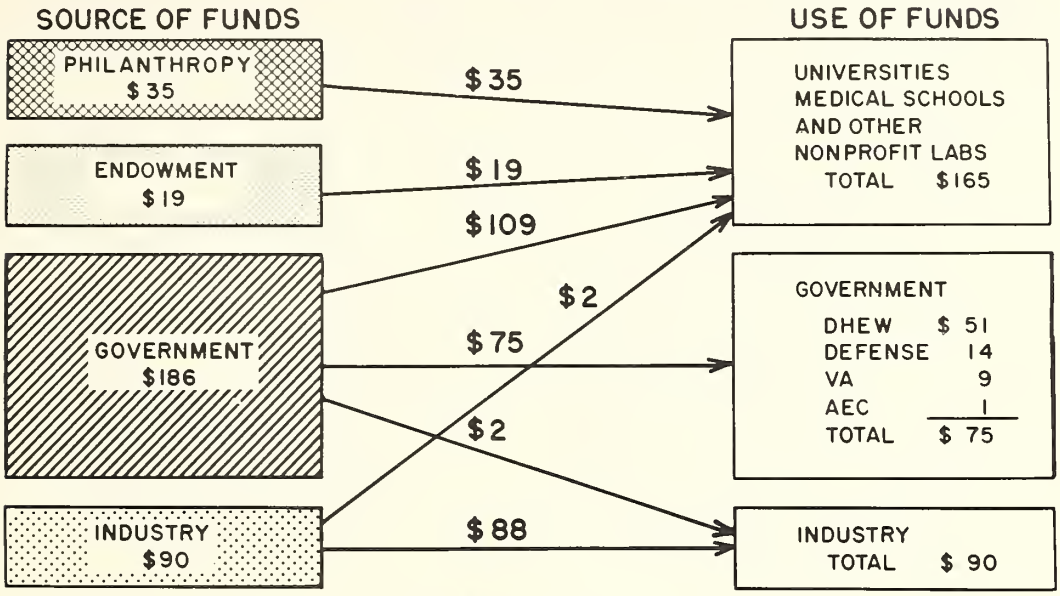
The shorp rise in expenditures far medical research is also ottributable ta the decline in purchasing pawer af the dallor (nat indicated on the chart).

The right side of the chart shows haw medicol reseorch expenditures progressed from o tatol af $45 millian in 1940 ta $330 million in 1957.

During this periad the funds in suppart of medicol research came fram faur majar sources—endawment, philanthrapy, industry, ond gavernment. The increase in gavernment support is noteworthy, porticulorly since the expansion is olmast entirely postwar. Federol spending in the medical research field has tended ta stimulate rather than reploce private effort.

MEDICAL RESEARCH 1957 – WHERE THE MONEY COMES FROM AND WHERE IT GOES



TOTAL $330 MILLION

In this chart the $330 million expended for medical research throughout the Nation in 1957 is broken down to show where the money comes from and where it is spent. NIH is important in this picture because the funds it administers are such a significant part of the total.

The $330-million estimate is low. For example, industrial medical research expenditures in 1957, according to a recent survey by the American Drug Manufacturers Association, is probably nearer $127 million than $90 million.

At the right, we see particularly the importance of schools and other nonprofit institutions (research hospitals, foundation laboratories, etc.) as the major centers of medical research. Industrial laboratories are the second largest component, and Federal laboratories the smallest part of the Nation's medical research structure.

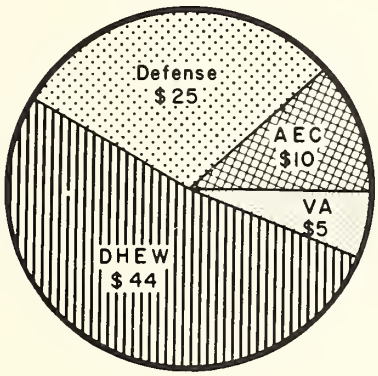
The pictured flow of money from the sources at the left to the laboratories at the right is revealing. Schools and other nonprofit institutions depend mainly on three sources of funds—philanthropy, endowment, and Federal research grants.

This demonstrates that research in medical schools, universities, and foundations depends on sources of support which they do not control. Funds come for the most part on a year-to-year basis.

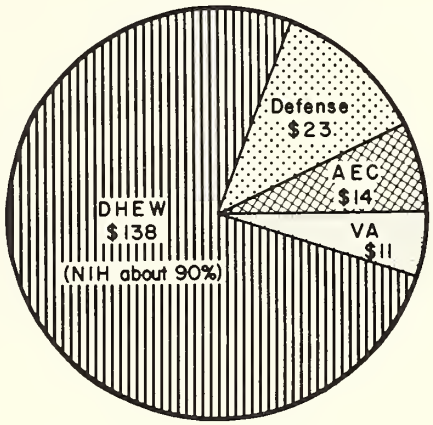
SUPPORT OF MEDICAL RESEARCH BY FEDERAL AGENCIES

DEPARTMENT OF HEALTH, EDUCATION, & WELFARE BECOMING MORE IMPORTANT

1953 TOTAL – $84 MILLION



1957 TOTAL – $186 MILLION



The total Federal expenditure for medical research in 1957 was approximately $186 million. To show relative magnitude of operations, this chart represents the distribution of the total over the four agencies in which medical research activities are concentrated. In addition, the National Science Foundation supports a modest amount of fundamental research related to medicine.

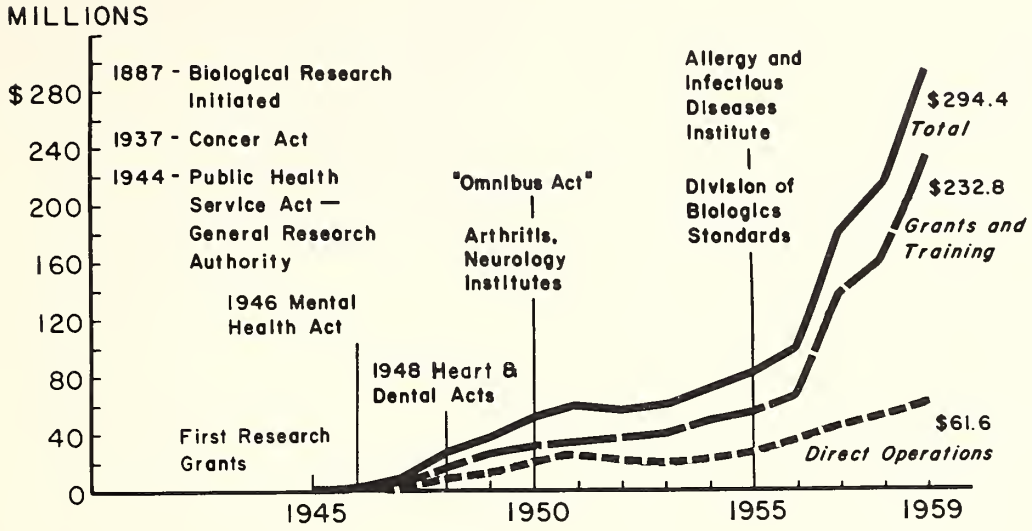
About $138 million, three quarters of the total, went to the direct and grant-supported research of the Department of Health, Education, and Welfare. NIH personnel and grantees received by far the largest share, though medical research is also conducted by other Department constituents.

Of the $138 million, about $87 million was distributed through research grants to hospitals, medical schools, and other non-Federal institutions. Funds for research training and other extramural programs of NIH are not represented. Those together with the research grant funds would total more than twice the expenditure for direct operations.

In fiscal year 1958, national medical research expenditures totaled about $425 million. The Federal share of this was $227, of which NIH contributed about $157.

Although most medical research under the armed forces is geared to military needs, a large proportion of the results are ultimately turned to peacetime use. The Atomic Energy Commission is second only to the National Cancer Institute as a Federal investor in cancer research.

LEGISLATION AND OPERATING FUNDS



This chart shows extramural and intramural appropriations since 1945 and the major legislation related to this growth.

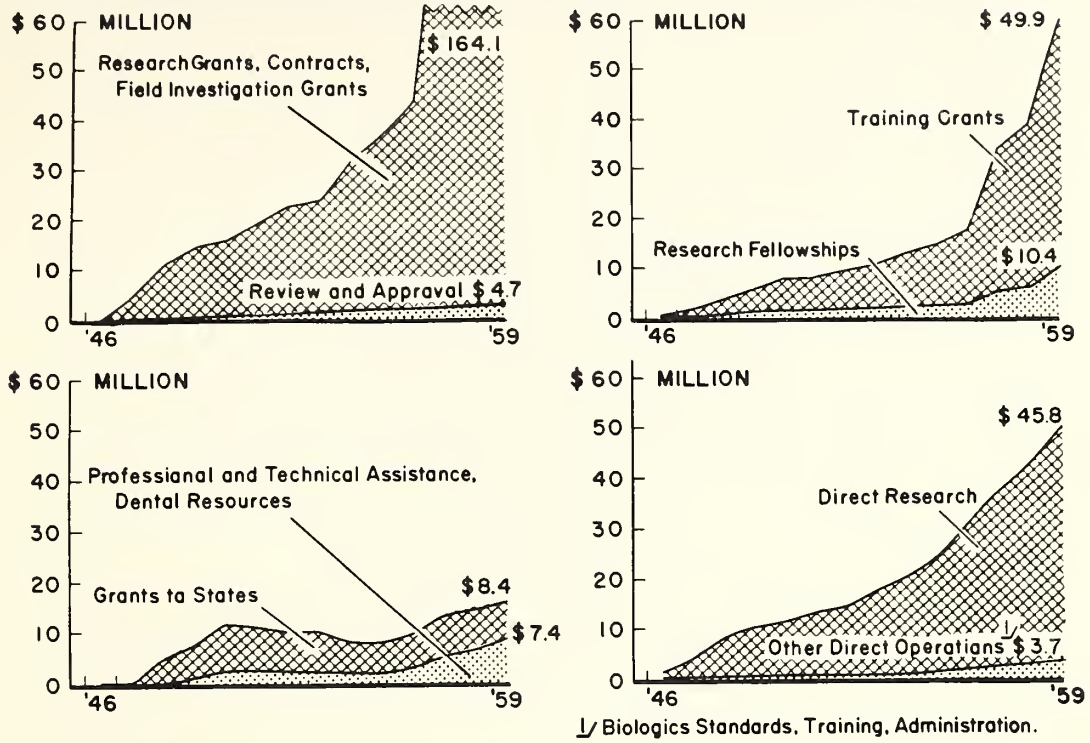
Beginning when the Public Health Service assumed grants formerly administered by the Office of Scientific Research and Development, the growth has been continuous, with the most significant increases found in grants to support research projects and research training.

The chart does not include the funds spent for the Clinical Center building program (1948-1953), which totaled $64 million—to acquire the land, to plan and construct and equip the building, and to provide for central auxiliary services that could be housed outside the Center and serve all of NIH.

Contracts with the chemical and pharmaceutical industry are included in "grants and training." They total $20 million for 1959.

The 'Omnibus Act' of 1950 permits the Surgeon General to establish additional institutes should the need arise.

NIH PROGRAM EXPANSION: 1946–1959



1/ Biologics Standards, Training, Administration.

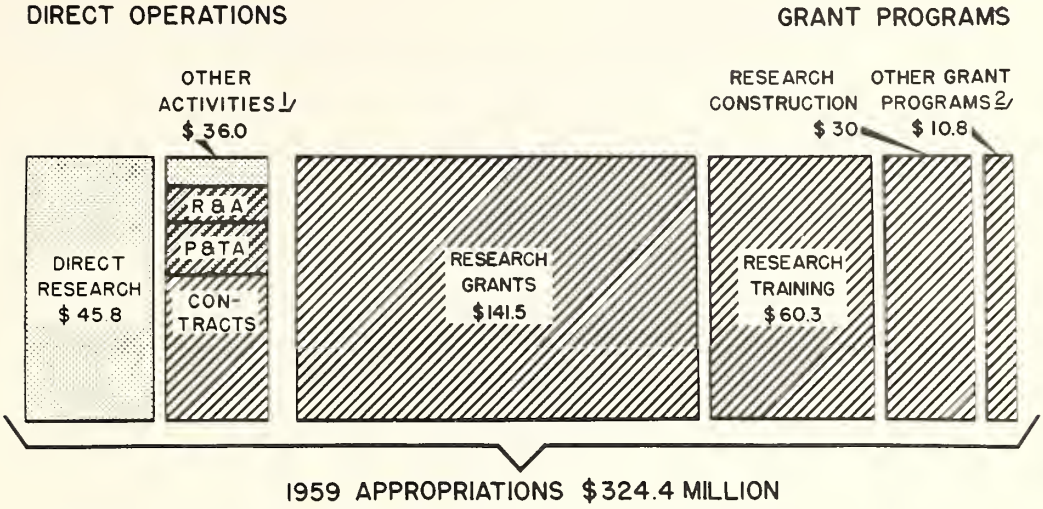
Successive legislation to increase the range of NIH activity has also resulted in progressive expansion of all major types of program. The chart represents four general approaches in the attack on health problems—research grants, aid to State and local programs, training awards, and direct operations.

Expansion has been greatest in the support of research and training and in research at Bethesda. The increase in administrative and other direct costs has been relatively small.

The following table gives approximate totals (in millions) of NIH appropriations, excluding those for construction. The column Direct Operations includes these items shown on the chart: Review and Approval of Grants, Professional and Technical Assistance, Dental Resources, Direct Research, and Other Direct Operations. The Grants and Training column includes Research Grants, Contracts, Field Investigation Grants, Grants to States, Training Grants, and Research Fellowships.

Year	Direct Operations	Grants & Training	Total
1946	2.2	.8	3.0
1947	4.0	4.0	8.0
1948	9.0	17.6	26.6
1949	12.2	25.5	37.7
1950	15.4	31.0	46.4
1951	16.5	34.1	50.6
1952	17.1	36.0	53.1
1953	19.8	39.2	59.0
1954	22.6	48.6	71.2
1955	26.9	54.4	81.3
1956	34.3	64.2	98.5
1957	44.7	138.3	183.0
1958	51.5	159.7	211.2
1959	61.6	232.8	294.4

FUNCTIONS OF NIH
RESEARCH PROJECTS, TRAINING AND CONSTRUCTION



1/ Biologics Standards, Review and Approval of Grants, Intramural Training, Professional and Technical Assistance, Chemotherapy Contracts, Dental Resources, Administration.

2/ Field Investigation, Control Grants to States Through Bureau of State Services.

Rounded off, the essential facts of the NIH budget for fiscal year 1959 are these:

Direct research	$ 46 million
Grant programs	242
Other activities	36
TOTAL	$324 million

"Direct research" in this context refers to the funds required to operate the NIH laboratories at Bethesda (including the Clinical Center) and at field stations.

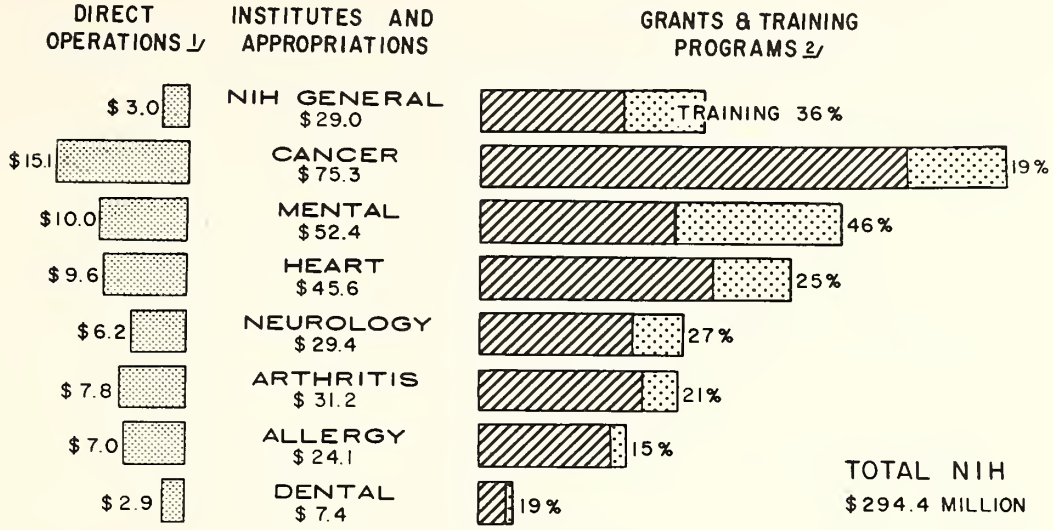
"Grant programs" refers to four types of support to non-Federal research institutions and individuals: 1) grants for medical research; 2) fellowships and teaching grants for the development of scientific manpower; 3) grants for construction of research facilities; and 4) grants to States for the control of disease.

The bar marked "Other Activities" represents mainly programs that provide direct support (contracts with industry, $20.2 million), or extramural services (professional and technical assistance, $7.1), or administrative aid (review and approval of grants, $4.7). These programs are grouped as direct operations by NIH fiscal offices.

Research construction grants are authorized at $30 million a year through fiscal 1961, with matching provisions.

The operation of disease control programs is primarily a responsibility of the Bureau of State Services, PHS.

PROGRAMS OF THE 7 INSTITUTES-1959



1/ Includes Direct Research, Biologics Standards, Review and Approval of Grants, Intramural Training, Professional and Technical Assistance, Dental Resources, and Administration.

2/ Includes Research Grants, Contracts, Fellowships, Training Grants, Field Investigation Grants, and Grants to States.

This chart represents the programs of the seven Institutes at NIH.

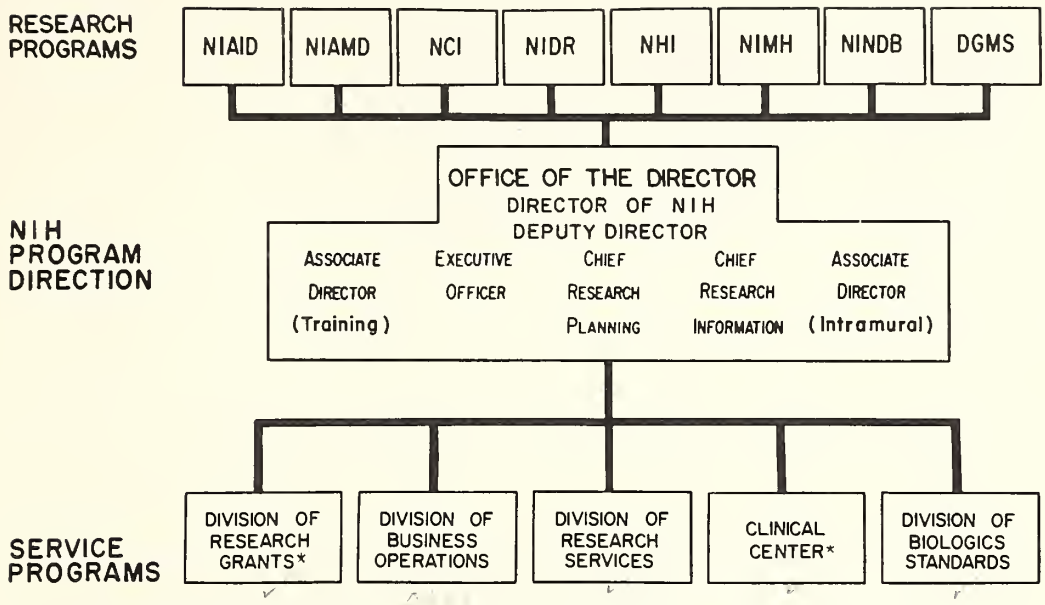
Each Institute conducts direct operations, laboratory and clinical, at Bethesda; and each has an extramural program, which is divided here into grants and training. Construction grants are not shown.

NIH has three relatively large programs—Cancer, Mental Health, and Heart—which account for about 60 percent of the total NIH budget. There are three Institutes of moderate size—Arthritis and Metabolic Diseases, Neurological Diseases and Blindness, and Allergy and Infectious Diseases. Finally, there is a relatively small Institute—The National Institute of Dental Research.

The portion of the chart marked "NIH General" represents a belief that there must be research in medicine that is not directly related to any specific disease. Grants to support such research are administered by the Division of General Medical Sciences. This bar also includes the funds allocated to the Division of Biologics Standards, organized to ensure the safety, purity, and potency of commercial biologic products.

The Division of Research Grants, the Clinical Center, and other central services are reimbursed from appropriations to the seven Institutes, DGMS, and DBS.

NIH ORGANIZATION



* Chiefs also serve on the immediate staff of the NIH Director, to provide continuity in establishing policy.

The research function of NIH is carried out by the seven Institutes and the Division of General Medical Sciences. Supportive and other operations are provided by five central services.

The Division of General Medical Sciences administers a program of noncategorical grants separate from those of the Institutes. One of its branches is the Center for Aging Research.

The Division of Research Grants provides central review and processing for all the grant programs of NIH.

Administrative, technical, custodial, and maintenance services to all programs are furnished by two Divisions—Business Operations and Research Services.

The Clinical Center provides a research patient facility for all the Institutes.

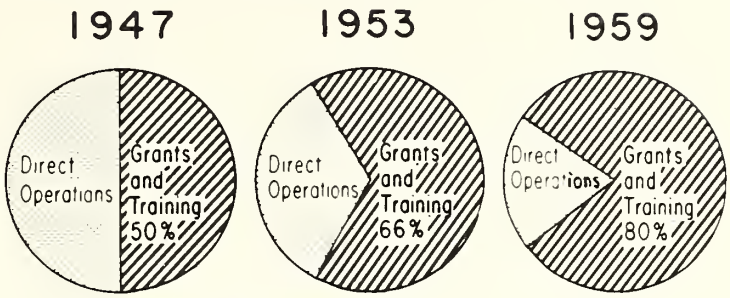
Responsibility for enforcing the Biologics Control Act, as well as conducting research on biologics, is vested in the Division of Biologics Standards.

Top program direction and coordination are provided by the Director of NIH, assisted by two Associate Directors—one for extramural, one for intramural programs—and by three senior staff members in the areas of research policy, administration, and information.

These five assistants, with several staff aids, work with the Institute Directors, Scientific Directors, and others in the Institutes and Divisions to coordinate and evaluate the activities of the research and support programs.

In addition, the seven Institutes and the Division of Biologics Standards are advised in direct research policy by Boards of Scientific Counselors, each composed of six non-Federal leaders in preclinical and clinical sciences,

GRANTS—A GROWING SHARE OF NIH FUNDS



	1947	1953	1959
DIRECT RESEARCH	$3.7 MILLION	$16.2	$45.8
OTHER DIRECT OPERATIONS	.3	3.6	15.8 1/
GRANTS AND CONTRACTS	3.6	29.0	172.5 2/
TRAINING AWARDS	.4	10.2	60.3 3/
	8.0	59.0	294.4

1/ Includes Biologics Standards $2.3 million, professional and technical assistance $7.1, dental resources $0.3, intramural training $0.3, review and approval of grants $4.7, administration $1.1.

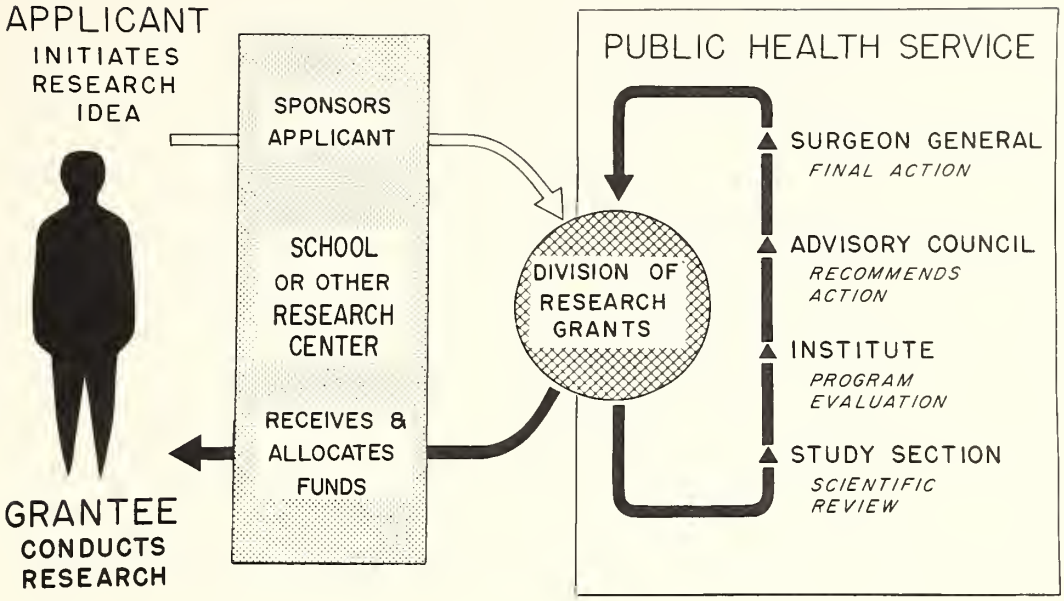
2/ Includes research project grants $141.5 million, chematherapy contracts $18.1, other NCI contracts $2.1, field investigation grants $2.4, grants to States $8.4.

3/ Includes training grants $49.9 million, research fellowships $10.4.

While expenditures for both the direct operations and the research and training grants of NIH have expanded over the past decade, those for the grant programs have expanded most rapidly. As a result, the proportion of the total NIH budget represented by extramural activities has risen from 50 percent in 1947 to 80 percent in 1959. Since 1953, the training component, though much increased in dollars, has received a fairly constant share (26 percent) of the total extramural expenditure.

Neither grants nor intramural funds for construction of facilities are shown.

HOW A RESEARCH GRANT IS MADE



The application for an NIH grant for research or training begins with the individual investigator. Thus, as a basic policy, the subjects of study are not prescribed, but instead follow the interest of scientists.

The application must be sponsored by the investigator's institution, since decisions must be made as to the facilities available.

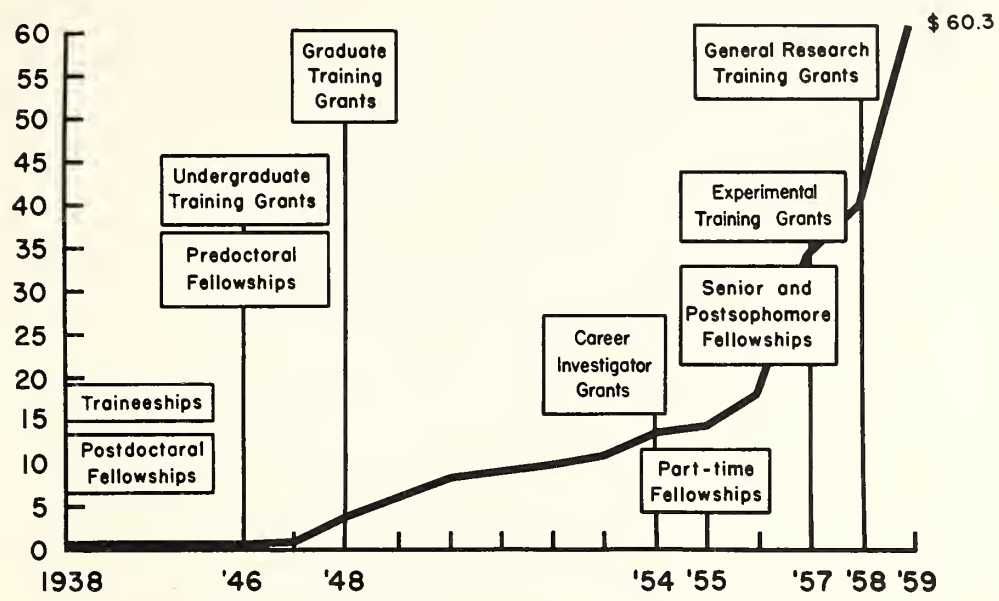
When a grant application is received by the Division of Research Grants, it is assigned to one of 30 Study Sections. These are composed mainly of scientists from universities and medical schools. They assess the competence of the applicant and the merits of the proposed research.

Next the Institutes review their total programs and see how the application fits. The matter is then brought before one of nine National Advisory Councils, composed of non-Federal leaders in science and public affairs. The Councils have two functions: 1) they review the actions of the Study Sections and make final recommendations to the Surgeon General, and 2) they advise on general policy questions.

Following Council recommendations, the Surgeon General approves or disapproves the grants. If the decision is favorable, the Division of Research Grants handles the mechanics of payment.

It has seemed essential on certain occasions to initiate and organize research from a central point, in part through contracts with industry. In this circumstance, the procedure outlined in the chart is not followed.

RESEARCH TRAINING-GROWTH OF NIH PROGRAMS



Research manpower bears a crucial relation to the Nation's health. The quality and volume of medical research is in direct proportion to the caliber and number of investigators devoting their efforts to the medical and biological sciences.

For the present, the Nation's competent medical scientists need more support. For the future, manpower shortages threaten to limit the volume and quality of medical research, and the demand for scientific personnel in all fields is steadily increasing.

The chart shows when the various types of training award were initiated. No type has been discontinued, though predoctoral fellowships were suspended through fiscal 1954. The curve shows combined NIH training funds, which have risen from $0.7 million in 1946 to $60.3 million for 1959.

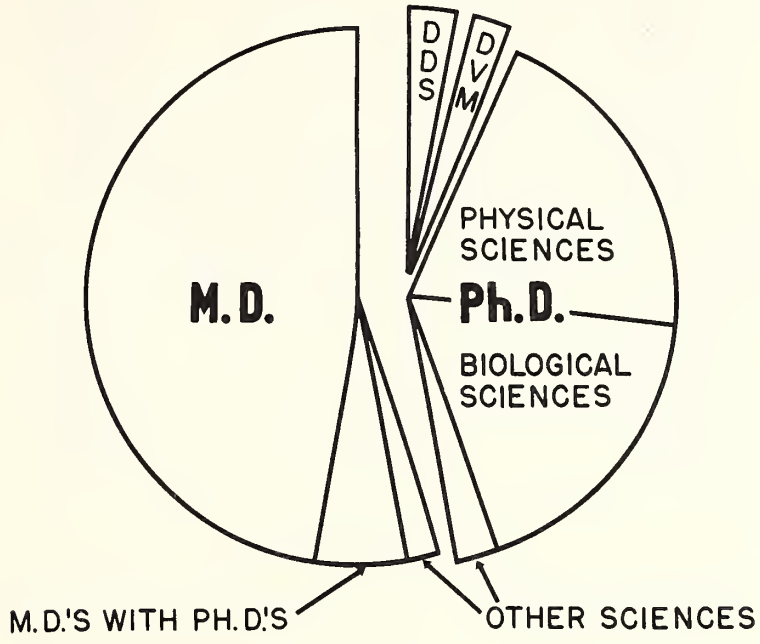
The two principal areas in the NIH training program are training grants and research fellowships.

The training grants program is intended to augment the Nation's supply of qualified investigators by aiding in the development of courses of instruction in schools of medicine, dentistry, nursing, and public health.

The research fellowship program is a direct approach, offering assistance to some of the more brilliant and promising students to pursue research careers in the medical field. A research fellow works at any suitable institution, under the guidance of an experienced investigator. In 1958, 2329 fellowships were awarded to individuals in 211 institutions. The postdoctoral fellowship program was extended on a modest basis to outstanding medical scientists of foreign countries.

Traineeships (included under training grants in the other charts) are designed to encourage advanced training in specialized areas of medical research.

PROFESSIONAL STAFF—1958
1000 PROFESSIONALS WITH DOCTOR DEGREES



This chart deals with direct NIH research activities in the laboratories at Bethesda and elsewhere.

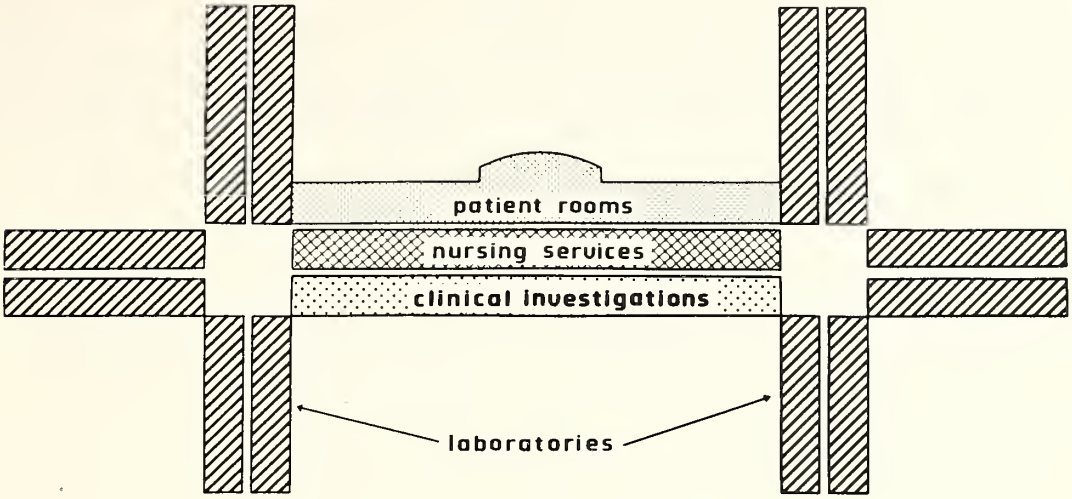
On June 30, 1958, the NIH staff of 7055 employees included 1003 with doctorates in medicine or science. Over half, 531, were M.D.'s. There were almost as many Ph.D.'s in the physical and biological fields—424. In addition, 45 of the physicians also had a Ph.D. or other doctorate in a science.

Ph.D.'s in the biological fields (biology, bacteriology, physiology, entomology) embraced 16 percent of the professional staff. The physical science group, 20 percent of the total, is largely in chemistry, and especially biochemistry.

There are smaller but important groups trained as dentists (D.D.S.), 23 persons; veterinarians (D.V.M.), 12; and doctors in other sciences, 13.

Each of the seven Institutes employs a wide range of medical and scientific specialties in its work.

THE CLINICAL CENTER
a facility for integrated research



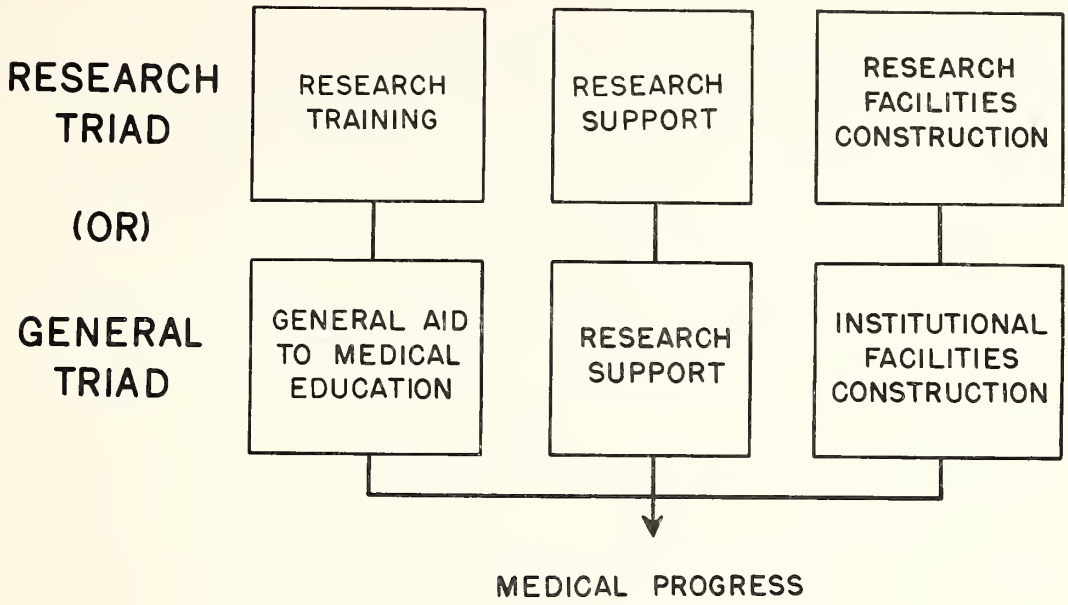
NIH is dedicated to an all-out attack on the major diseases of man. Its facilities must therefore permit a combined laboratory and clinical approach to medical investigation. Promising leads derived from laboratory studies must ultimately be applied in humans; and conversely, the clues and theories obtained through clinical observation must be submitted to the laboratory for verification.

It was to meet this need that the Clinical Center was authorized in 1947 and opened in 1953. Its sole purpose is to bring together the many specialized laboratory sciences and clinical disciplines for the study of disease in man.

The Clinical Center contains 516 beds and several hundred laboratories. Its average daily census is approximately 400 patients. The patients' beds and the facilities and staff for their medical care are immediately adjacent to clinical and basic-science laboratories. Each Institute is allocated bed and laboratory space according to its research needs, and the nursing, dietetic, and other services are provided centrally. The diseases under study in the Clinical Center are those on which the research interests of the seven Institutes are focused.

Patients are admitted only if they meet a research need and are referred by their own physician. This ensures accurate advance diagnosis, the cooperation of the private physician, and a channel for the patient's return when the studies here are completed.

INTERRELATED ELEMENTS OF SUPPORT
MEDICAL RESEARCH - MEDICAL EDUCATION



The postwor increase in the volume of research hos imposed o problem upon medical schools. A way must be devised to help them offord their lorge reseorch octivities.

Unless gifts from individuals increase many times, there oppeor to be only two potential sources of adequate funds—corporote earnings and Federal taxes.

To this unresolved problem of source must be added the question of the interrelations between scientific manpower, research, and physical facilities. Over the past decade, the major development has been expansion of research support on an individual project basis. Workers have been trained and facilities built, but these two elements of the 'research triad' have been subordinate.

Now there is increosing need for emphasis upon the production of highly competent investigators ond the exponsion of loborotory focilities.

Whot is the best long-range approoch? In proctice, the construction of reseorch facilities is involved with the schools' total need for spoce, ond the instruction of the potential investigator cannot be seporoted from that of the total student body. Hence, the best opproach to either privote or public support of medical research may be to strengthen the medical schools and universities totally, leaving them more independence in the allocation of funds.

This question of the balance between specific and general aid will become increasingly urgent.